EXHIBIT 14

Final

Explanation of Significant Differences to the Final Record of Decision for Parcel C

Hunters Point Shipyard
San Francisco, California

October 2014
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Prepared for:
NAVFAC Naval Facilities Engineering Command
NAVFAC SOUTHWEST

Prepared by:
KCH

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Prepared for:

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Acronyms and Abbreviations

µg/L	microgram per liter
BCT	Base Realignment and Closure Cleanup Team
bgs	below ground surface
CAA	corrective action area
CCSF	City and County of San Francisco
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
DTSC	California Department of Toxic Substances Control
EPC	exposure point concentration
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FS	Feasibility Study
ft bgs	feet below ground surface
HHRA	human health risk assessment
HI	hazard index
HPAL	Hunters Point ambient level
HPNS	Hunters Point Naval Shipyard
IC	institutional control
IRP	Installation Restoration Program
KCH	CH2M HILL Kleinfelder, A Joint Venture
mg/kg	milligram per kilogram
Navy	United States Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIRIS	Naval Installation Restoration Information Solution
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl

RA	remedial action
RAGS	*Risk Assessment Guidance for Superfund*
RAO	remedial action objective
RBC	risk-based concentration
RD	remedial design
RG	remedial goal
RI	remedial investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RU	remedial unit
RWQCB	California Regional Water Quality Control Board, San Francisco Bay Region
SS/SD	sanitary sewer/storm drain
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TCRA	time-critical removal action
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
yd^3	cubic yards
ZVI	zero-valent iron

1.0 Introduction

1.1 Statement of Purpose

The Final Record of Decision for Parcel C (Final ROD) at the former Hunters Point Naval Shipyard (HPNS) was signed on September 30, 2010. This Explanation of Significant Differences (ESD) to the Final ROD documents changes to the remedial action (RA) soil excavation boundaries. Changes to the soil excavation boundaries presented in the Final ROD (Navy, 2010) were proposed in Appendix G of the *Final Work Plan, Parcel C Remedial Action, Remedial Units C1, C2, C4, and C5, and Building 241(Excludes C2)* (Technical Memorandum) (Shaw, 2013).

These changes are a result of applying tiered action levels for soil excavation where high concentrations of select contaminants of concern (COCs) will be removed based on risk identified in a screening-level human health risk assessment (HHRA) rather than excavating to remedial goals (RGs) in all excavation locations. The tiered action levels (Tier 1 and Tier 2) are based on the RGs identified in the Administrative Record that were presented in the Final ROD executed by the United Stated Department of the Navy (Navy) and the Federal Facility Agreement (FFA) signatories (Navy, 2010). Tier 1 action level is defined as locations where select COCs are present at ten times the RG. Tier 2 action level is defined as locations where select COCs are present at five times the RG. Implementation of these tiered action levels for the excavation portion of the selected soil remedy will result in a change to the RGs as presented in the Final ROD, scope reduction and cost reduction, but no change to the remedial action objectives (RAOs) and no fundamental change to the overall cleanup approach of excavation and protective cover.

The Final ROD was issued pursuant to the Navy's authority as the lead federal agency for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for remedy selection at sites at former HPNS pursuant to Sections 104 and 120 of CERCLA, Executive Order 12580, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The lead regulatory agency for overseeing site cleanup at HPNS is the United States Environmental Protection Agency (USEPA). In addition to the USEPA, state agencies including the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) and the California Department of Toxic Substances Control (DTSC) oversee the site cleanup at former HPNS pursuant to the FFA.

This ESD will become part of the Administrative Record File for Parcel C and will be available for public review at the following locations:

San Francisco Main Library
100 Larkin Street
Government Information Center, 5th Floor
San Francisco, CA 94102
Phone: (415) 557-4500

Information Repository
Hunters Point Shipyard Site Trailer
690 Hudson Avenue
San Francisco, CA 94124

The complete Administrative Record is located at 1220 Pacific Highway, San Diego, California, and is maintained by Ms. Diana Silva, Naval Facilities Engineering Command (NAVFAC), Southwest Administration Record Manager, phone: (619) 532-3676.

The preparation of this ESD is pursuant to Section 117(c) of CERCLA, as amended by the Superfund Amendment and Reauthorization Act of 1986, and pursuant to 40 Code of Federal Regulations (CFR) Section 300.435(c)(2)(i). This ESD was prepared in accordance with the USEPA guidance document, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA, 1999).

1.2 Project Objective

The objective of this ESD is to document changes to excavation boundaries based on a screening-level HHRA associated with exposure concentrations of COCs above the RGs in excavation areas identified in the Final ROD. The changes in excavation boundaries focus on removing higher concentrations of select COCs that pose a more substantial risk to human health. Tier 1 (ten times the RG) and Tier 2 (five times the RG) action levels were used to identify areas where higher concentrations of select COCs would be excavated. The application of tiered action levels for the excavation boundaries will result in changes to the specific numerical RGs identified in the ROD. However, the RAOs and the installation of a cover remedy identified in the Final ROD will not change. The cover remedy addresses unacceptable risk posed by residual contamination. This change in excavation boundaries, along with placement of the cover and implementation of institutional controls (ICs), still meets the soil remedial action objectives (RAOs) as specified in the Final ROD.

1. Prevent or minimize exposure to organic and inorganic chemicals in soil at concentrations above remediation goals developed in the HHRA for the following exposure pathways:
    a. Ingestion of, outdoor inhalation of, and dermal exposure to, surface and subsurface soil.
    b. Ingestion of homegrown produce in native soil.
2. Prevent or minimize exposure to volatile organic compounds (VOCs) in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors.

1.3 ESD Organization

This ESD is organized into the following sections:

- Section 1 – Introduction
- Section 2 – Summary of Site History, Contamination, and Selected Remedy
- Section 3 – Basis for Significant Changes in the Selected Remedy
- Section 4 – Description of Significant Differences

- Section 5 – Support Agency Comments
- Section 6 – Statutory and Regulatory Determinations
- Section 7 – Public Participation
- Section 8 - References

2.0 Summary of Site History, Contamination, and Selected Remedy

This section presents a summarized description and history of HPNS Parcel C, as presented in the RA Work Plan (Shaw, 2013). Four remedial units (RUs) in Parcel C (RU-C1, RU-C2, RU-C4, and RU-C5) were defined based on sources of contamination in groundwater. The Final ROD (Navy, 2010) identified 31 excavation areas associated with these RUs and Building 241. This ESD presents changes to some excavation boundaries resulting from a tiered approach where soils exceeding the RGs are left in place for metals (excluding mercury) and polychlorinated biphenyls based on the results of a screening level HHRA which shows these locations are within the acceptable risk range and/or are statistically similar to background. The screening level HHRA was originally performed on eight of the 31 excavations but only five excavations (22-2, 23-1, 24-3, 24-5, and 11-2) met the criteria for reduction. Excavation area 22-2 was removed from consideration because only one sample for organic lead was present above RGs and the location is at the sidewall of a previous excavation under a historic building. Excavation area 24-3 was removed from consideration because the area was previously excavated twice and the elevated risk is a result of ubiquitous metals arsenic and vanadium whose concentrations are comparable to background. The remaining three locations will be excavated based on the tiered approach.

2.1 Site Description and History

The main portion of HPNS is situated on a long headland located in the southeastern part of San Francisco extending eastward into the Bay (Figure 2-1). The headland is bounded on the north and east by the Bay and on the south and west by the Bayview/Hunters Point district of San Francisco. Parcel C consists of about 73 acres of shoreline and lowland coast along the east-central portion of HPNS (Figure 2-2). Parcel C, located south of Parcel B and east of Parcel D-1 and Parcel G, is bounded on the east by the Bay, on the south by Berths 8 and 9, on the southwest by Dry Dock 4, and on the west by Fisher Avenue. Parcel C is the oldest portion of the shipyard and has been used almost exclusively for industrial purposes since the late 1800s. Historically, the dominant land use of Parcel C has been for shipping, ship repair, and office and commercial activities. According to the redevelopment plan (SFRA, 2010), Parcel C is expected to be zoned to accommodate buildings for cultural and institutional uses; research and development; and mixed-use areas for live/work spaces for artists that will include studios, galleries, warehouses, and hotels. The area along the eastern portion of Parcel C bounded by the Bay will be set aside as open space.

2.2 Summary of Site Risks for Soil at Parcel C

This section provides a summary of site risks associated with soil at Parcel C as presented in the Final ROD. Risk associated with groundwater and radionuclides in structures at Parcel C is not the subject of this ESD and is not discussed in the following summary. During the remedial investigation (RI), the Navy concluded that limited viable habitat is available for terrestrial wildlife at Parcel C because most of the site is covered with

pavement. Therefore, ecological risk associated with exposure to soil was not evaluated further.

2.2.1 Site Risks for Soil

The source of contamination in soil at Parcel C is attributed to industrial operations and radiological research activities by the Navy and other tenants. The contamination is from identified Installation Restoration Program (IRP) sites with associated spills and leaks. Naturally occurring and ubiquitous metals, such as arsenic and manganese, are also found at levels consistent with ambient concentrations in the local serpentine bedrock. The primary fate and transport mechanisms include volatilization, wind suspension, migration of contaminants via infiltration and percolation into subsurface soil, and root uptake.

Both total and incremental human health risks were evaluated for exposure to soil. All detected chemicals, including naturally occurring ubiquitous metals from the serpentine bedrock-derived fill material, were included as chemicals of potential concern for the total risk evaluation, regardless of their concentration The total risk evaluation estimates the risks posed by chemicals at the site, including those present at concentrations at or below ambient levels. The essential nutrients calcium, magnesium, potassium and sodium were excluded as chemicals of potential concern in soil for the incremental risk evaluation, as well as the detected ubiquitous metals with maximum measured concentrations below the Hunters Point ambient levels (HPALs). The incremental risk evaluation estimates risks posed by metals present at the site that are above the estimated ambient levels.

Based on the revised HHRA results for soil, chemical cancer risks within Parcel C are greater than 10^{-6} at all redevelopment blocks except COS-1, which was evaluated for recreational risk. Noncancer hazard indexes (HIs) were less than 1 for redevelopment blocks CMI-1, evaluated for industrial risk, and COS-1, COS-2, and COS-3, evaluated for recreational risk. Eight of these redevelopment blocks (10, 11, 13, 18, 20A, 23, 24, and 26) with the higher chemical cancer risks and noncancer HIs were evaluated against the more stringent residential exposure scenario. Redevelopment blocks are shown on Figure 2-2. Potential cancer risks from soil are based on inhalation of chlorinated VOCs and other VOCs, and on ingestion or contact with arsenic, lead, polycyclic aromatic hydrocarbons (PAHs) and other semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). Potential noncancer hazards from soil are based on ingestion of or contact with organic lead and manganese. The risk from indoor air inhalation via vapor intrusion from soil was not evaluated in the HHRA; however, action levels for soil gas that are protective of indoor air exposure from vapor intrusion of soil and groundwater were established during the remedial design (RD) to address exposure to volatile chemicals in the subsurface at concentrations that would pose unacceptable risk (ChaduxTt, 2010).

Additionally, radiological risk was calculated based on estimated concentrations of contamination at radiologically affected sites, using remediation goals for each radionuclide of concern. Actual calculated risk will be based on field measurements after final status survey results have been received for each affected site.

2.3 Previous Studies and Removal Actions

The Navy has completed a number of treatability studies and removal actions at Parcel C. These actions have reduced or eliminated certain risks to human health and ecological receptors. Based on these removal actions and treatability studies, the sources and extent of remaining contamination in soil and groundwater has been well-characterized (Table 2-1).

Storm drains and sanitary sewer lines were removed in 2007 in portions of former Redevelopment Blocks 10 and 11 in Parcel C to address radiological concerns. Removal of storm drain and sanitary sewer lines within the remainder of Parcel C started in 2010. Phase I of this work was reported in the *Draft Radiological Removal Action Completion Report Parcel C, HPNS, San Francisco, California* (Tetra Tech EC, Inc., 2012) and Phase II will be reported in a future document. Final excavation boundaries from Phase I storm drains and sanitary sewer line removals and Phase II planned removals are included in the excavation figures of this ESD (Figures 4-2 through 4-12 in Section 4).

2.4 Summary of Selected Remedy

The CERCLA remedy selected in the Final ROD (Navy, 2010) is necessary to protect human health and the environment from actual or potential releases of hazardous substances, pollutants, and contaminants from the site. The remedy consists of excavation and offsite disposal, soil vapor extraction (SVE), durable covers, and ICs to address soil contamination (Alternative S-5); treatment of VOCs with zero-valent iron (ZVI) or a biological substrate, monitored natural attenuation, and ICs to address groundwater contamination (Alternative GW-3B); and decontamination of buildings, removal of storm drains and sewer lines, and excavation to address radiologically affected soil (Alternative R-2). The remedy for Parcel C addresses metals, PAHs, other SVOCs, VOCs, PCBs, and pesticides in soil; and radionuclides in structures (such as buildings) and in soil. The remedy also addresses VOCs, PAHs, and SVOCs found in groundwater in both the A- and B-aquifers, and metals and pesticides found in the B-aquifer.

The remedy is protective of human health and the environment, complies with federal and state statutes and regulations that are applicable or relevant and appropriate to the remedy, and is cost-effective. The selected remedy (1) uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and (2) satisfies the statutory preference for remedies employing treatment that reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element. A statutory review will be conducted within 5 years after the Final ROD was signed to ensure that the remedy is, or will be, protective of human health and the environment.

This ESD applies only to the soil excavation component of the remedy (Alternative-S-5) and therefore other remedy components (Alternatives GW-3B and R-2) are not discussed further in this document.

2.4.1 Summary of Selected Soil Alternative S-5

Soil Alternative S-5 was selected to meet the following soil RAOs:

Prevent or minimize exposure to organic and inorganic chemicals in soil at concentrations above remediation goals developed in the HHRA for the following exposure pathways:

a. Ingestion of, outdoor inhalation of, and dermal exposure to, surface and subsurface soil.

b. Ingestion of homegrown produce in native soil.

Prevent or minimize exposure to VOCs in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors.

The remedy selected in the Final ROD consists of excavation, disposal, covers, SVE, and ICs. Excavation would consist of removing soil in selected areas where COCs exceed remediation goals, and disposing of excavated soil at an offsite facility. Excavations were planned at 31 areas within Parcel C, with a total removal of approximately 42,000 cubic yards (yd^3) of soil, and were to be conducted to a maximum depth of 10 feet below ground surface (bgs). Post-excavation sampling and analysis would be used to verify that remedial goals were achieved. Clean soil would be placed and compacted to backfill excavated areas.

SVE would be implemented as a source reduction measure to address VOC-contaminated soil. The SVE areas border soil sampling locations where VOCs were detected at concentrations above remediation goals and where soil characteristics are appropriate for SVE.

Across Parcel C, durable covers will be applied as physical barriers to break the exposure pathway to ubiquitous metals in soil. Existing asphalt and concrete surfaces (repaired as necessary to be durable) and buildings will also act as covers. The type of new covers installed will be consistent with the redevelopment plan (for example, soil covers may be used for open space areas, or asphalt for industrial areas).

This ESD presents changes to some excavation boundaries resulting from a tiered approach where soils exceeding the RGs are left in place for metals (excluding mercury) and polychlorinated biphenyls based on the results of a screening level HHRA which shows these locations are within the acceptable risk range and/or are statistically similar to background. The screening level HHRA was originally performed on eight of the 31 excavations but only four excavations met the criteria for reduction."

3.0 Basis for Significant Changes in the Selected Remedy

This section presents information that supports a change to the soil remedy (S-5) selected in the Final ROD (Navy, 2010). The RGs in the Final ROD (Navy, 2010) were originally applied to soil areas within Parcel C to develop the excavation boundaries. Changes to the soil excavation boundaries presented in the Final ROD (Navy, 2010) were proposed in Appendix G of the *Final Work Plan, Parcel C Remedial Action, Remedial Units C1, C2, C4, and C5, and Building 241(Excludes C2)* (Technical Memorandum) (Shaw, 2013). This information in the Administrative Record supports the need for a change to the Final ROD. On December 4, 2012, the Navy and regulatory agencies held a meeting in Oakland, California to discuss re-evaluation of the soil excavations for RU-C1, RU-C2, RU-C4, and RU-C5, and Building 241.

An evaluation of ambient manganese conditions at HPNS was conducted to identify its level and extent in soil (TtEMI, 2001b). Additionally, a revised screening-level HHRA was performed to determine if leaving soil with concentrations exceeding the RGs for ubiquitous metals and organic chemicals in place would still be protective of human health. Based on the screening-level HHRA results, the tiered approach was applied to specific excavations where higher concentrations of select metals and organic chemicals existed (at 5x and 10x the RGs), and it was concluded that the recommended modifications to the remediation strategy would still be within the acceptable risk range and below a hazard index of 1. The tiered approach remains protective of human health by reducing risk to within the risk range (defined as 1E-4 to 1E-6 as discussed in the NCP [USEPA, 1994]) and/or reducing the hazard to below 1. Further, the implementation of the tiered approach does not change the soil RAOs as the revised approach still prevents or minimizes exposure to chemicals at concentrations above the revised RGs at these locations.

This tiered approach applies only to metals (excluding mercury) and PCBs. All other COCs (mercury, total petroleum hydrocarbons [TPH], VOCs, PAHs, and pesticides) will be remediated to the RGs set forth in the Final ROD. Table 4-1 lists each excavation area, its associated tier, COCs, and action levels.

Incorporation of tiered action levels for select excavations is the subject of this ESD. This excavation strategy was implemented using the USEPA Triad methodology (2001) in coordination with the Base Realignment and Closure Cleanup Team (BCT). The BCT includes representatives from USEPA, DTSC, RWQCB, City and County of San Francisco (CCSF), and the Navy.

4.0 Description of Significant Differences

In accordance with NCP Section 300.435(c)(2), and USEPA guidance on preparing proposed plans, RODs, and other remedy selection decision documents (USEPA, 1999), post-ROD changes may be categorized as non-significant (or minor) changes, significant changes, or fundamental changes based on the nature of change with respect to scope, performance, and/or cost. Non-significant changes are minor changes that usually arise during design and construction, when modifications are made to the functional specifications of the remedy to optimize performance and minimize cost. This may result in minor changes to the remedy implementation, which could be documented in a Memorandum to the Administrative Record File. If the change involves components of the remedy and does not fundamentally alter the selected remedy, it is regarded as a significant change. If the change in remedy fundamentally alters the ROD in such a manner that the proposed action, with respect to scope, performance, or cost, is no longer reflective of the remedy selected in the ROD, the lead agency is required to issue a notice of availability and brief description of the proposed amendment to the ROD.

Changes to the remedies documented in this ESD are considered significant because they involve components of the remedy but do not fundamentally alter the selected remedy. The changes do not affect evaluation of the selected remedies with respect to NCP evaluation criteria, and they comply with all applicable or relevant and appropriate requirements identified and documented in the Final ROD. There is no fundamental change in the performance of the remedy but there are changes to excavation areas and volumes (i.e., scope) and cost of the selected remedy.

The following excavation areas have significant changes where boundaries were removed or modified.

Removed based on the tiered approach to excavation.

- RU-C1 – Soil Excavation 22-2
- RU-C4 – Soil Excavation 24-3

Modified Excavation Boundaries and Depth based on the tiered approach to excavation.

- RU-C4 – Soil Excavations 23-1 and 24-5
- RU-C5 – Soil Excavation 11-2

The following excavation areas have non-significant changes where excavation depth was revised to extend 1 foot vertically from the known extent of contamination rather than 10 feet bgs as described in the Final ROD.

- RU-C4 – Soil Excavations 24-2, 24-4, and 26-2.
- RU-C5 – Soil Excavations 10-3, 10-4, and 11-1
- Building 241 – Soil Excavations 18-2, and 18-4

No changes are proposed for the following areas. Excavation at these areas will be based on RGs as presented in the Final ROD rather than the tiered approach presented in this ESD.

- RU-C1 - Soil Excavations 22-1, COS-2-1, and COS-2-2
- RU-C2 - Soil Excavations 20A-1, 20B-1, 13-1, and 20B-2
- RU-C4 – Soil Excavations 23-2, 23-3, 24-1, 24-6, 26-1, and CMI-1
- RU-C5 – Soil Excavations 10-1, 10-2, and 10-5
- Building 241 – Soil Excavations 18-1, and 18-3

4.1 Excavation Evaluation Approach

The original soil excavation footprints and name/identification (Figure 4-1) were defined in the *Final Feasibility Study for Parcel C, Hunters Point Naval Shipyard, San Francisco, California* (Final FS) (SulTech, 2008), repeated in the Final ROD (Navy, 2010) and Final RD (KCH, 2012). In cooperation with the FFA signatories, the Navy developed a revised tiered approach that reduces excavation of soil that will not pose an unacceptable risk to human health and the environment once the remedy is fully implemented. Excavations were evaluated based on historical excavations, recent excavations, and available sample data. This section addresses the general concept of applying a tiered approach to excavations.

4.1.1 Tiered Approach

Removal of ubiquitous metals and organic chemicals in soil at concentrations exceeding RGs could involve excavating very large quantities of soil (i.e., over 40,000 bank cubic yards) from Parcel C. A screening-level HHRA was performed to determine the risks and hazards associated with exposure to concentrations of COCs lower than five times the RGs (with an acceptable risk defined as falling within the risk management range [i.e., 1E-4 to 1E-6] as discussed in the NCP [USEPA, 1994]). Rather than excavate all soils containing ubiquitous metals above RGs and all organics with isolated concentrations above RGs, excavation focused on removing higher concentrations of COCs. Isolated locations were identified through a review of existing sample data to determine if there were high concentration locations generally surrounded by lower or risk-based tiered concentrations. The tiered approach includes:

- Tier 1 locations that contain COCs at concentrations greater than ten times the RGs
- Tier 2 locations that contain COCs at concentrations greater than five times the RGs

It should be noted that Tier 1 locations (ten times the RG) by definition also include Tier 2 locations (five times the RG). The Navy focused the list of COCs to those present at concentrations that exceeded the RGs by a factor of 5 (Tier 2). These generally correspond to an excess cancer risk of 1 in 1,000,000 or a noncancer HI of 1 based on an evaluation of incremental risk. The areas are referred to as Tier 1 and Tier 2 locations.

This tiered approach applies only to metals (excluding mercury) and PCBs. Metals and PCBs were chosen for the tiered approach since these COCs do not migrate in soil and can be successfully contained under a durable cover. An evaluation of ambient manganese conditions at HPNS was conducted to identify its level and extent in soil (TtEMI, 2001b). Metals that are ubiquitously encountered at Hunters Point (e.g., manganese) are often above RGs and are associated with the basement rock underlying the surface fill and the fill itself.

All other COCs (mercury, total petroleum hydrocarbons [TPH], VOCs, PAHs, and pesticides) will be remediated to the RGs set forth in the Final ROD. Table 4-1 lists each excavation area, its associated tier, COCs, and action levels.

Screening-Level Human Health Risk Assessment

As described in the Technical Memorandum (Shaw, 2013), a new screening-level HHRA was performed to estimate the residual risks and hazards associated with excavation to Tier 1 and Tier 2 action levels for metals (excluding mercury) and PCBs for the following excavation areas:

- Excavation 22-2
- Excavation 23-1
- Excavation 24-3
- Excavation 24-4
- Excavation 24-5
- Excavation 10-3
- Excavation 10-4
- Excavation 11-2

These eight excavation areas were chosen because the contamination identified in the Final FS (SulTech, 2008) was mostly attributed to concentrations of ubiquitous metals exceeding the RGs established in the Final ROD and/or isolated detections of COCs with elevated concentrations of organics. The results of the HHRA showed three of the locations (10-3, 10-4, and 24-4) would not be consistent with a tiered approach. Contamination in these areas will be removed to the RG; however, the excavation footprint will be reduced as detailed in Section 4.2.4.

Residual exposure point concentrations (EPCs) in soil were estimated within the excavation footprint from 0 to 10 feet bgs using USEPA (2013) *ProUCL Software*, based on data input files representative of future exposure conditions following Parcel C remediation. The ProUCL Software, Version 4.1, statistical program was used to estimate 95 percent upper confidence limits (UCLs) on the mean for the chemical data sets. For data sets with a combination of non-detect and detect results, ProUCL Software uses the Kaplan-Meier estimation method to derive a recommended 95 percent UCL (USEPA, 2010). Where ProUCL Software recommended the results of more than one statistical approach, the most conservative (highest) 95 percent UCL value was used. Where fewer than approximately three samples had detected values, or less than or equal to five samples were available, ProUCL Software did not calculate a 95 percent UCL value. In these cases, the maximum detected concentration was conservatively used as the EPC.

To estimate residual cancer risks and noncancer hazards, the estimated EPCs were scaled with numeric residential risk-based concentrations (RBCs) from the Final FS (SulTech, 2008), as follows:

- Estimated risk = 95 percent UCL EPC/RBC × 1E-6, for RBCs based on cancer health endpoint
- Estimated hazard = 95 percent UCL EPC/RBC × 1.0, for RBCs based on noncancer health endpoint

Individual COC cancer risks were summed for each Parcel C excavation area, as delineated in the Final FS (SulTech, 2008), to obtain a total estimated residual cancer risk. Individual COC noncancer hazards were also summed for each Parcel C excavation area to obtain a total estimated residual noncancer HI.

Estimated residual risks and hazards were compared with the target risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0, as discussed in the NCP (USEPA, 1994) and *Risk Assessment Guidance for Superfund* (RAGS), Part A (USEPA, 1989). As discussed in USEPA's Office of Solid Waste and Emergency Response directive (USEPA, 1991), if the cumulative carcinogenic risk to a receptor (based on reasonable maximum exposure for both current and future land use) is less than 1E-4 and the noncarcinogenic HI is equal to or less than 1, then action generally is not warranted unless adverse environmental effects are likely.

The screening-level HHRA was presented in Attachment 2 of the Technical Memorandum and represents post-RA conditions. A summary of results is presented in Table 4-2.

Although some excavation areas have estimated residual hazards above 1.0, these slightly elevated hazards are a result of ubiquitous metals. Residual concentrations of manganese in Excavation 23-1 and Excavation 24-5, and vanadium in Excavation 24-3, are similar to background (based on background hypothesis testing using USEPA *ProUCL Software* [2013]) (Shaw, 2013). Past studies conducted at HPNS concluded that the highest concentrations of natural manganese in rocks of coastal California are found in chert and basalt contained in the Franciscan Complex. (TtEMI, 2001a; TtEMI, 2001b) Excavation Areas 23-1 and 24-5 fall within an area where this chert is interbedded with shale and has been mapped or identified. According to the studies, this area has manganese concentrations ranging from 11,000 mg/kg to 30,200 mg/kg.

Residual concentrations of arsenic in Excavation 24-3 are also similar to background (based on background hypothesis testing using USEPA *ProUCL Software* [2013]) (Shaw, 2013). Because the residual hazard exceeds 1.0 it could represent a residual site-related risk or more likely an unusually high background outlier. The slightly elevated hazard is deemed acceptable because the concentrations are comparable to background and the RAOs are met. The RAOs are met because any residual risk is adequately managed by the protective cover. Background manganese data were from Tetra Tech EMI, Inc. (TtEMI, 2001a) and Innovative Technical Solutions, Inc. and Tetra Tech, Inc. (2004), while background arsenic and vanadium data were from Innovative Technical Solutions, Inc. and Tetra Tech, Inc. (2004).

4.2 Changes to Soil Excavation Boundaries

This section presents the changes for each excavation area in comparison with the Final ROD (Navy, 2010). Figure 4-1 shows the excavations as presented in the Final ROD and Figure 4-2 indicates the excavations with changes to boundaries based on the tiered approach. Estimated residual risks and hazards were compared with the target risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0, as discussed in the NCP (EPA, 1994) and *Risk Assessment Guidance for Superfund (RAGS)*, Part A (EPA, 1989) to determine which tier should be applied to excavation areas.

Sample results currently reported to the Naval Installation Restoration Information System (NIRIS) were used during preparation of figures to present as comprehensive a data set as

possible. NIRIS does not distinguish between old samples and more recent samples that may have been collected as confirmation samples for a remediated location. A comprehensive attempt to manually delete samples that were removed through excavation was made during the preparation of the excavation figures for the Technical Memorandum (Shaw, 2013).

4.2.1 RU-C1

Planned excavation 22-2 will not be included in the RA based on applying the tiered approach (Figure 4-3).

Soil Excavation 22-2

The COC identified for Excavation 22-2 is organic lead. Only one sample (IR27GB01) located adjacent to the building foundation (Building 205) at 4.5 feet bgs had an organic lead concentration of 0.93 milligrams per kilogram (mg/kg). The future use for this area is recreational and the recreational RG for organic lead is 0.5 mg/kg (SulTech, 2008), which is the practical quantification limit for organic lead. Data for sample IR27GB01 are not available in the Navy NIRIS database; however, data appear in the *Parcel C Time-critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, California* (TtEMI, 2002b) with the following information in the legend: "Result for Pre-excavation Discrete Sidewall Confirmation Sample Exceeds Industrial Cleanup Goal for Soil."

The soil exceedance is located at the wall of a historical building within the Hunters Point Commercial Dry Dock District and the 0.93 mg/kg organic lead concentration is less than five times the RG (Tier 2) (see Table 4-1). There are no other samples in the area showing organic lead in excess of the recreational RG. This excavation area will not be included in the RA.

4.2.2 RU-C4

The boundaries of excavations 23-1, 24-3 and 24-5 were revised based on applying the tiered approach (Figures 4-4 through 4-11, 4-12, and 4-13, respectively). Based on the revised boundaries, excavation 24-3 will not be included in the Remedial Action.

Soil Excavation 23-1

Sample results exceeding RGs (primarily metals with the exception of mercury) were screened by applying Tier 1 action levels (ten times the RGs) (see Table 4-1). Sample locations exceeding Tier 1 action levels within the original excavation footprint were identified for excavation and a revised excavation footprint extending a minimum of 5 feet laterally around each exceedance was applied. The areas identified in Figures 4-4 through 4-11 are proposed to be excavated to a minimum of 1 foot deeper than samples exceeding Tier 1 action levels. Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths.

Soil Excavation 24-3

The majority of Excavation 24-3 was previously excavated twice (IT Corporation, 1999; TtEMI, 2002b). The estimated risk for Excavation 24-3 is 3.07E-04 and the estimated residual hazard is 1.9. The elevated risk is a result of arsenic, a ubiquitous metal, and the elevated hazard is attributed to background values of vanadium, also a ubiquitous metal. These slightly elevated hazards are deemed acceptable because the metal concentrations are comparable to background. Residual concentrations of arsenic are also comparable to

background (based on background hypothesis testing using EPA *ProUCL Software* [2013]; Attachment 2). No further excavation will take place at this location (Figure 4-12).

Soil Excavation 24-5

Sample results exceeding RGs (primarily metals with the exception of mercury) were screened by applying Tier 2 action levels (five times the RGs) (see Table 4-1). Excavation 24-5 will be reduced to extend approximately 5 feet laterally from sample locations exceeding action levels. This eliminates excavation of areas below action levels within the previous footprint. The excavation depth will be reduced to approximately 7 feet bgs, which is 1 foot deeper than the sample depths showing results exceeding action levels (Figure 4-13). Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths.

The estimated risk for Excavation 24-5 was not calculated because arsenic was the only carcinogen and the residual EPCs were estimated to be below the HPAL background concentrations. The estimated residual hazard is 5.8 (greater than the 1.0 threshold). The hazard is largely attributed to background values of manganese, a ubiquitous metal. Residual manganese concentrations in Excavation 24-5 are comparable to background (based on background hypothesis testing using USEPA *ProUCL Software* [2013]; Shaw, 2013). Past studies conducted at HPNS concluded that the highest concentrations of natural manganese in rocks of coastal California are found in chert and basalt contained in the Franciscan Complex. (TtEMI, 2001a; TtEMI, 2001b) Excavation Areas 23-1 and 24-5 fall within an area where chert interbedded with shale has been mapped or identified. This area according to the studies has manganese concentrations ranging from 11,000 mg/kg to 30,200 mg/kg. Because the HI exceeds 1.0 it could represent a residual site-related risk or possibly an unusually high background outlier. The slightly elevated hazard is deemed acceptable because the concentration for the elevated hazard (manganese) is comparable to background and the RAOs are met. The RAOs are met because any residual risk is adequately managed by the protective cover.

4.2.3 RU-C5

The boundaries of excavation 11-2 were revised based on applying the tiered approach (Figure 4-14).

Soil Excavation 11-2

Approximately 35 percent of Excavation 11-2 was previously excavated between an RA for CERCLA contaminants and TPH in 1999 (IT, 1999), Parcel B excavation in 2000 for tank removals (IT, 2000), Parcel B removal action in 2004 (SulTech, 2004), and the more recent phase I sanitary sewer/storm drain (SS/SD) radiological removal action data report for Parcel C (TtEC, 2012). The southwestern section of the excavation boundary identified by the Final FS (SulTech, 2008) does not contain sample results that exceed RGs and will not be included in the RA.

Sample results exceeding RGs (primarily metals with the exception of mercury) were screened by applying Tier 2 action levels (five times the RGs) (see Table 4-1). For Excavation 11-2, the estimated residual cancer risk is 2.1E-06 and the estimated residual noncancer HI is 0, which are within the risk management range discussed in the NCP (USEPA, 1994). The excavation will be reduced to excavate the one contaminated soil sample location that

exceeds Tier 2 levels. A 10-foot by 10-foot area will be excavated to approximately 7.5 feet bgs, 1 foot below the sample depth known to exceed action levels, as shown in Figure 4-14. A second 10-foot by 10-foot area will be excavated to approximately 7.5 feet bgs, which further reduces the risk and hazard for this area. Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths.

4.2.4 Documentation of Non-Significant Changes

The areas of the following excavations were revised to extend 1 foot vertically from the known extent of contamination rather than 10 feet bgs as described in the Final ROD.

- Soil Excavation 10-3
- Soil Excavation 10-4
- Soil Excavation 11-1
- Soil Excavation 18-2
- Soil Excavation 18-4
- Soil Excavation 24-2
- Soil Excavation 24-4
- Soil Excavation 26-2

4.3 Evaluation of Remedy Change for Parcel C

4.3.1 Review of Relevant Guidance

The USEPA has published guidance (USEPA, 1999) for addressing post-ROD changes in RAs. This guidance provides the basis for the Navy's post-ROD remedy change for Parcel C. The guidance states "The lead agency's categorization of a post-ROD change to the Selected Remedy is a site-specific determination and must consider the following as set out in NCP §300.435(c)(2).

- *Scope*. Does the change alter the scope of the remedy (e.g., type of treatment or containment technology, the physical area of the response, remediation goals to be achieved, type and volume of wastes to be addressed)?
- *Performance*. Would the change alter the remedy performance (e.g., treatment levels to be attained, long term reliability of the remedy)?
- *Cost*. Are there significant changes in costs from estimates in the ROD, taking into account the recognized uncertainties associated with the hazardous waste engineering process selected? (Feasibility Study cost estimates are expected to provide an accuracy of +50 percent to -30 percent).

Based on this evaluation, and depending on the extent or scope of modification being considered, the lead agency must make a determination as to the type of change involved (i.e., nonsignificant or minor, significant, or fundamental change). Remedy changes should fall along a continuum from minor to fundamental. Similarly, an aggregate of nonsignificant or significant changes could result in a fundamental change.

Post-ROD changes fit into one of the three following categories:

- *Nonsignificant or Minor Changes* usually arise during design and construction, when modifications are made to the functional specifications of the remedy to address issues such as performance optimization, new technical information, support agency/community concerns and/or cost minimization (e.g., value engineering process). Such changes may affect things such as the type or cost of materials, equipment, facilities, services, and supplies used to implement the remedy. The change will not have a significant impact on the scope, performance, or cost of the remedy.
- *Significant Changes* generally involve a change to a component of a remedy that does not fundamentally alter the overall cleanup approach.
- *Fundamental Changes* involve an appreciable change or changes in the scope, performance, and/or cost or may be a number of significant changes that together have the effect of a fundamental change. An example of a fundamental change is one that results in a reconsideration of the overall waste management approach selected in the original ROD."

4.3.2 Evaluation of Remedy Change for Parcel C

The Navy evaluated the Parcel C post-ROD remedy changes against the criteria presented in the above-quoted USEPA guidance, as follows:

Scope

The selected remedy remains S-5: Excavation, Disposal, Covers, Soil Vapor Extraction and ICs. However, the total excavation area, and resulting volume, will be reduced from the original 42,000 yd^3 to 22,289 yd^3. The new screening-level HHRA conducted to address removal to Tier 1 and Tier 2 action levels versus RGs provided the justification that the change in excavation boundaries does not pose a substantial risk to human health. Additionally, the change in excavation boundaries does not change the requirement for the installation of a cover remedy identified in the Final ROD. This cover is anticipated to break the exposure pathway to meet the associated RAOs.

Performance

The selected remedy uses Tier 1 and Tier 2 action levels in accordance with the new HHRA to within the 95 percent UCL for the risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0. In addition, the cover, SVE, and ICs all serve to break the pathway of potential exposure for COCs left in place. Therefore, the performance of the remedy is not changing.

Cost

The cost identified in the Final ROD, Soil Alternative S-5, was a Capital Cost of $17,236,000 and an Operations and Maintenance Cost of $3,552,000. The ESD revisions to Soil Alternative S-5 will reduce the capital cost by approximately 23 percent because of the reduced volume of excavation. The tiered approach will result in an approximate volume reduction of 16,000 cubic yards. The estimated cost for excavation, personnel, soil sampling, backfilling, and soil disposal is approximately $250 per cubic yard. This equates to a cost reduction of approximately $4,000,000. The cover, SVE, and ICs are still included in the revised remedial alternative.

Type of Change

Based on this evaluation, the Navy considers these changes to be significant. Application of tiered action levels for the excavation portion of the selected soil remedy will result in changes to the specific numerical RGs identified in the ROD. The tiered approach results in scope reduction and cost minimization but does not fundamentally alter the RAOs or the overall cleanup approach of excavation and protective cover. The protective cover ensures the contaminant pathway is broken and the tiered approach does not result in an unacceptable risk.

Administrative Process Requirements

A notice of availability and a brief description of the ESD will be published in a local newspaper and a copy of the ESD will be provided in the Hunters Point repository and local libraries.

5.0 Support Agency Comments

Appendix A presents regulatory comments received on the Draft ESD and the Navy's response to these comments. Revisions based on the agency comments were incorporated into this final version of the ESD.

6.0 Statutory and Regulatory Determinations

The modifications to the RA for the Final ROD set forth in this ESD are significant but not fundamental. The RA remains protective of human health and the environment and continues to comply with applicable or relevant and appropriate requirements identified in the Final ROD, in accordance with CERCLA Section 121(d)(2) and NCP Section 300.430(f)(1)(ii)(B)(1) and (2).

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Date

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Date

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Dr. Ryan K. Miya
San Francisco Peninsula Team Leader
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Date

Bruce H. Wolfe — 10/27/14

Mr. Bruce H. Wolfe
Executive Officer
California Environmental Protection Agency
California Regional Water Quality Control Board, San Francisco Bay Region

Date

7.0 Public Participation

This ESD will become part of the Administrative Record Files for the site (NCP, 40 CFR Sections 300.435(c)(2)(i)(A) and 300.825 (a)(2)). A notice of public availability and a brief description of the ESD will be published in a major local newspaper as required by the NCP, 40 CFR Sections 300.435(c)(2)(i)(B). The ESD will be available for public review at the following locations:

San Francisco Main Library
100 Larkin Street
Government Information Center, 5th Floor
San Francisco, CA 94102
Phone: (415) 557-4500

Information Repository
Hunters Point Shipyard Site Trailer
690 Hudson Avenue
San Francisco, CA 94124

The complete Administrative Record is located at 1220 Pacific Highway, San Diego, California, and is maintained by Ms. Diana Silva, Naval Facilities Engineering Command, Southwest Administration Record Manager, phone: (619) 532-3676.

For access to the Administrative Record or additional information on the Parcel C remedial activities, contact:

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